

## UTAH LAKE SURVEYS

In 1872, Salt Lake County constructed a dam on the Jordan River near the boundary line between Salt Lake County and Utah County for the purpose of diverting the water from Jordan River from its natural channel and causing it to flow through the several canals (paragraph 7, Findings of Fact, Colladge Decree).

Immediately upon the completion of this dam, controversy arose over the effect of the dam upon the lake. The land owners adjacent to the lake feared that the water would be raised so high in the lake that their lands would be flooded and they would suffer damages thereby.

In order to determine definitely the effect of this dam upon the surface of the lake, General J. W. Fox, a surveyor, began a survey on December 22, 1873, along the shores of Utah Lake. Mr. Fox had been employed by the Salt Lake County selectmen to make this survey.

He placed four markers on the edge of Utah Lake to determine the elevation of the lake at various times and to determine what effect the dam would have on the elevation of the lake.

There were four of these markers placed as follows:

- (1) At or near Provo City, 4 December 1873; the marker or post was five feet above water surface.
- (2) In American Fork, the location of this mark or post undetermined.
- (3) In the Jordan River at the Lehi Bridge, 4 December 1873; this marker or post was placed 4.1 feet above water surface in the river.
- (4) At the outlet of the Utah Lake or the head of the Jordan River, 6 December 1873; this marker or post was placed 3 feet above the water surface.

These markers or posts were put in when the water at the dam was lowered above 20 inches by drawing of the head gates of dam. (See Page 38, Book C, Record of County Court, Salt Lake County, Utah.) Report by Reuben Miller, Selectman. Head gates of dam washed out by persons unknown. Water of dam fell to same height that it was before the dam was constructed on the river. (Same as above citation.)

As told in Bulletin No. 124, page 63, "the next spring (1873) water was high in the lake and the county court of Utah County at once communicated with the county court of Salt Lake County, suggesting that the members of the courts of the two counties meet and consider what should be done in the matter. No agreement was reached, and as a consequence 'the head gates washed out, being helped by persons

unknown', as the record of the county court of Salt Lake County expressed it. This was in the winter of 1873-74. The dam was rebuilt the following spring".

On the 7th of March, the selectmen of Salt Lake County and General Fox, accompanied by George E. Evans and William Winn of Lehi, examined the marks or posts heretofore described and determined the washing out of head gates and lowering the water of the dam to the original height did not affect the water at the outlet of Utah Lake or the head of the Jordan River.

Marks or posts examined on 6 August 1874 by General Fox and selectmen. It was ascertained that raising the water of the dam had no affect on lake. Outlet of lake was  $1\frac{1}{2}$  inches lower than when examined on 7 March 1874. (See Page 38, Book C. Record of County Court, Salt Lake County, Utah. Report by Reuben Miller, Selectman.)

General Fox reported that a test of the water level on the lake was made on the 4th to 6th of August 1880, and the water surface of the lake was 4.1 feet below the high water mark of 1862. In June 1880, the water in the lake was 12 inches (gates of dam being used), higher than it was at the date of the examination of gates having been replaced. Opinion was that if the lake was held at the June level, 3 feet below high water mark (of 1862), little damage would be done. (See page 784, Record C. Record of County Court, Salt Lake County.)

Following this study made by General Fox in 1880, a compromise agreement of 1885 was entered into, which definitely set the compromise level at an elevation 3 feet  $3\frac{1}{2}$  inches above the low water mark in said lake.

The compromise agreement of 1885 provided that a stone monument was to be established near the head of the Jordan River by the Utah Lake Commission to mark the elevation of the compromise point. This monument was established, and was set 4 feet 6 inches above compromise. This monument was to be a marker from which the true elevation of compromise level could be determined at any time.

Later on (1896), the Colladge Decree provided that in order to determine where this compromise level was, at another point on the lake shore, a survey should be made as follows:

"It is further ordered, adjudged and decreed that a survey shall be made and a permanent monument shall hereafter be established and maintained at the expense of the plaintiffs in said Utah Lake at a point to be hereafter agreed upon by the parties hereto or fixed by the Court, between a point one mile north of Provo River and a point five miles south of the mouth of said river, where it will be least subject to temporary fluctuations of the height of the water

by winds or the influx of Spanish Fork and Provo Rivers, to perpetuate said agreed elevation, and that said monument when so established, shall be maintained as the controlling evidence of the elevation at which the water of said lake is authorized to be maintained by the plaintiffs under said contract".

In the Colladge Decree, page 186, the stone monument is referred to as follows:

"It is further ordered, adjudged and decreed, that when at any time in each year the high water of Utah Lake shall have receded to an elevation four feet and six inches (4 ft. 6 in.) below the top of the stone monument near the head of Jordan River which was established by the Utah Lake Commission in 1885, and said elevation being the point referred to in the said contract, as three feet three and one half inches (3 ft.  $3\frac{1}{2}$  in.) above the point heretofore established and recognized as low water mark in said lake, the plaintiffs have the right to keep and maintain planks in either or both of their dams....".

The survey ordered by the Colladge Decree was made by A. F. Doremus immediately after the decree was signed.

The Doremus survey is described in the A. B. Larson re-survey report, and shows that Doremus set not just one monument as required by the decree, but several monuments described in the A. B. Larson report as follows:

Survey to Establish a Permanent Monument to Perpetuate  
Compromise Level

"In 1895 a survey was made by A. F. Doremus and Charles DeMoisey for the purpose of establishing a permanent monument to perpetuate the elevations of what is known as Compromise Level in Utah Lake. On the first page of the note book used by Mr. Doremus, we find the following statement:

'Notes by A. F. Doremus of the line of levels run by himself and Charles DeMoisey between the head of Jordan River and Snail Island under authority of the District Court and for the purpose of establishing a permanent monument on said Island to perpetuate the elevation of what is known as the Compromise Level of Utah Lake; Compromise Level of Lake assumed as having elevation of 100 feet and the red sandstone monument at southwest corner of log cabin at head of Jordan River as having elevation 104.50 feet.'

"On November 25, 1895, A. F. Doremus and Charles DeMoisey proceeded to run a double line of levels from the above described sandstone monument at the head of the Jordan River to Snail Island.

"In running this line they established a bench mark at the Geneva Resort, described by Mr. Doremus as follows:

'This B. M. consists of a red sandstone 8 inches square and 3 feet long set in the ground so that the top of the stone is about 2 inches above the surface of the ground. The rod point is indicated by a cross cut in the top of the stone. The elevation 114.647 is the mean of the two lines of levels. The stone is between the 3rd and 4th tree in a row of poplars south of the wooden steps leading down to the water from the top of the bluff or table on which the pavilion and other buildings at this lake resort stand.'

"They also set a bench mark on the north shore of Smith's Lake described by Mr. Doremus as follows:

'This B. M. consists of a red sandstone 8 inches square and 3 feet long set in the ground so that the top of the stone is about 3 inches above the surface of the ground. The rod point is indicated by a cross cut in the top of the stone. The elevation is 101.831, that being the mean of the two lines of levels. The stone is west of the old river channel and north of the lake, or arm of the lake, at this point, it was set with the view that this might be determined upon as the location of the permanent monument; and too, in the meantime, perpetuate the elevation. After setting this stone we returned to Hub #101 under willow in Knudson's pasture, previously set as B. M. and from there continued line southward to Snail Island as shown by the notes which here follow:'

"At Snail Island they established a bench mark described by Mr. Doremus as follows:

'This B. M. consists of a red sandstone 8 inches square and 3 feet long set in the ground so that the top of the stone is about 3 inches above the surface of the ground. The rod point is indicated by a cross cut in the top of the stone. The elevation 101.58 is the mean of the two lines of elevation. The stone is on the crest of Snail Island about one mile south of the Provo Lake Resort; and was set with a view that this might be selected as the site of the permanent monument and to, in the meantime, perpetuate the elevation. The Island is quite narrow at this place as will appear from the cross-section represented by the notes recorded on the next page.'

"In 1899, A. F. Doremus and Charles DeMoisey established a permanent monument at Snail Island, the original notes of Mr. Doremus read as follows:

'Thursday, December 21, 1899 -- went to Provo accompanied by Frank Gawn and met Mr. Charles DeMoisey. Hired a team at Sharp's Stable, William Woodhead driver, and went to Snail Island to transfer elevation from temporary to permanent stone monument, recently erected there by DeMoisey and myself, under authority of the District Court.

'The monument was similar to the one erected by him at the head of the Jordan River and described on the preceding page. Frank Gawn acted as levelman, DeMoisey as rodman and I as note-keeper and photographer.'

"Mr. Doremus was authorized by the Board of Canal Presidents to erect a permanent monument near the head of the Jordan River in 1899 and his notes regarding this matter are as follows:

'I having been authorized by the Board of Canal Presidents to erect a substantial stone monument on the shores of Utah Lake near the outlet of the Jordan River and after having erected the stone which is a shaft of white sandstone about 6 feet long set 3 feet in the ground, surrounded by a cube of concrete about 6 feet square and projecting about 3 feet above the surface of the ground. The stone is hammer dressed to taper from 16 inches square at the ground line to 10 inches square at the top. The stone presents a quarry face with chisel draft at each of the four corners. A brass plate with the words "Lake Monument" is imbedded in one face of the stone. The rod point is a copper bolt set into the stone near its base. For the purpose of transferring the essential point from the old red sandstone, at the southwest corner of cabin, I went to the lake on Wednesday, December 20, 1899 accompanied by George Chaney. From Lehi we were driven to the lake by Mr. William Wing. Chaney handled the level and I the rod. We made the transfer in the manner shown by the following notes.'

"The notes show that the elevation of the rod point on this monument was 105.985 or 5.985 above Compromise Level."

#### SNAIL ISLAND MONUMENT

"What is known as the Snail Island Monument was established by A. F. Doremus and Charles DeMoisey in the fall of 1899. The following description is found in the original notes of A. F. Doremus when the work of establishing the monument was completed on December 21, 1899:

'Thursday, December 21, 1899 -- went to Provo accompanied by Frank Gawn and met Mr. Charles DeMoisey, hired a team at Sharp's Stable - William Woodhead, driver, and went to Snail Island to transfer elevations from temporary to permanent stone monument recently erected by Mr. DeMoisey and myself under authority of the District Court. The monument is similar to the one erected by me at the head of the Jordan River and described on the preceding page.'

'..... and after having erected the stone which is a shaft of white sandstone about 6 feet long set 3 feet in the ground surrounded by a cube of concrete about 6 feet square and projecting

about 3 feet above the surface of the ground, the stone is hammer dressed to taper from 16 inches square at the ground line to 10 inches square at the top. The stone presents a quarry face with chisel draft at each of the four corners. A brass plate with the words "'Lake Monument'" is imbedded in one face of the stone. The rod point is a copper bolt set into the stone near its base. Frank Gawn acted as levelman, DeMoisey as rodman, and I was note-keeper and photographer. The transfer was made in the manner indicated by the following notes:'

"These notes show that the metal rod point on this monument was found to have an elevation of 102.322 or 2.322 above compromise.

"This monument was established on a low ridge in loose sandy material. The bottom of the monument was not more than 18 inches below the surface of the ground. During the period from 1900 to 1906 inclusive, the maximum yearly elevation of the lake varied from 0.5 feet to 2 feet below compromise. It was sufficiently high for several months each year to saturate the material around this monument. In 1907, the maximum water elevation in the lake was 2 feet above compromise. In 1908 about 0.9 feet above compromise, in 1909 3 feet above compromise, in 1910 2 feet above compromise, in 1911 at compromise, in 1912 one foot below compromise, in 1913 at compromise, and in 1914 1.2 feet above compromise.

"It is evident therefore that the base of this monument was saturated for several months each year during the high water season and in most years allowed to drain and dry out during the latter portion of the year. The monument being founded, as it was, on loose sandy material, there is no reason to expect that it would maintain its original position. As proof that it did not maintain its original position, I submit the following evidence:

"From the minutes of a meeting of the Utah Lake and Jordan Dam Commission held on January 14, 1911, we find the following:

'Mr. Creer expressed the belief that the present year would be a busy one for the Utah Lake and Jordan Dam Commission. Demands had been made in the past for observations to determine the difference, if any, between the records of the monument at Snail Island and the pumping plant, which demands may sooner or later have to be satisfied'.

"From the minutes of a meeting of the Utah Lake and Jordan Dam Commission held on October 29, 1911, we find the following.

'Utah Lake and Jordan Dam Commission (including all members and secretary) met at Provo on the arrival there, of the morning train on the San Pedro railroad, and proceeded by team to Snail Island, where an observation was taken by Mr. Doremus determining

the lake's level to be 2.62 feet below compromise point. W. A. Knight who was present reported that an observation taken by him at the pumping plant this morning under favorable conditions showed the lake level to be exactly 3 feet below compromise point, an apparent difference of 0.38 feet between the two readings.'

"In the minutes of a meeting of the Utah Lake and Jordan Dam Commission held on January 31, 1914, we find the following:

'Secretary Lambert reported that in accordance with the minutes of the last meeting, he had notified the Board of Presidents by letter that Commissioners Doremus and Hinkley had been appointed by the board to act in their behalf in the matter of erecting a monument at the Steel Bridge west of Lehi and at the Turner Dam and would proceed with the work as soon as assured that the funds to cover the expense would be forthcoming. A reply thereto had been received from the secretary of the Board of Presidents announcing that the funds would be ready whenever the bills for the expense for building the monument should be presented. He had then notified Commissioner Doremus and Hinkley that they were expected to proceed with the work.

'Commissioner Hinkley explained that his absence from Provo had prevented his acting in the matter, and Commissioner Doremus explained that he had requested the City Engineer who had an organized force under his direction to proceed with the work as he and Commissioner Hinkley would direct. Some obstacles had been met with which prevented the work from being done and he had suggested to the City Engineer that he might level down from the monument at the pumping plant to the bridge and to the Turner Dam and get the data with sufficient accuracy to serve the purpose of the canal companies pending the establishment of permanent monuments to indicate compromise level and he thought probably that had been done. He had the promise of the Engineer that he would be notified when the Engineer was ready to proceed with the work and then he and Commissioner Hinkley will be on hand to direct.'

"In the minutes of a meeting of the Utah Lake and Jordan Dam Commission held on August 19, 1912, we find the following statement:

'Commissioner Hinkley stated that the Snail Island monument needed looking after and repairing.'

"The following is a copy of a letter written by Sylvester Q. Cannon, Chairman of the Board of Presidents to the Utah Lake Commission dated March 4, 1922:

'In connection with the matter of the monuments governing the elevation of the water surface of Utah Lake, you will remember that we determined some 9 years ago that there was a difference

of elevation of the monument at the pumping plant and that at Snail Island of about 4 inches, the elevation of the Snail Island monument being that much lower than that at the pumping plant.

'In view of the fact that the original monument is located within 50 feet of the present monument, that the elevation of this present monument was determined from that old stone and that the levels were carried from that point around the lake, a distance of several miles to the Snail Island monument, we are certain that any difference in the elevations of these two points is due either to inaccuracy in levels or to settlement of the Snail Island monument on account of its insecure foundation.

'That this latter is the case would appear to be proven also by the fact that the Snail Island monument has settled .7 of a foot, or about 8.4 inches since the joint levels were run under the direction of your honorable body by Messrs. Collier and Wentz in 1914. This fact was determined by a survey made by Messrs. T. F. Wentz and W. A. Knight on March 28, 1921.

'In the report the statement is made that the Snail Island monument is undermined on the west and slightly inclined to the west, the ground around the base being lake sand.

'In behalf of the Board of Canal Presidents, therefore, I take occasion to call this matter to your attention, and to suggest the importance of definitely establishing the Pumping Plant monument as the correct datum for the determination of lake elevations.'

"In a letter from the Utah Lake Commissioner to Sylvester Q. Cannon, Chairman of the Board of Canal Presidents dated February 18, 1918, recommendation #2 reads as follows:

'That the difference claimed to exist in the elevation between the monument at the head of Jordan River (Known as Lehi monument) and the monument near the mouth of Provo River (known as the Snail Island monument) be reconciled and that thereafter both monuments be equally recognized as the official point for determining the compromise points of Utah Lake.'

"Recommendation #3 reads as follows:

'That the elevation essential to the administration of the contract known as the compromise be perpetuated by the establishment of a permanent bench mark on the new concrete dam at Jordan Narrows as contemplated by the Court Commissioner J. Fewson Smith. A copy of which is herewith enclosed after the accuracy of the said elevation shall have been verified.'

"From the above quotations, it is evident that there was a doubt

in the minds of those connected with the operation of Utah Lake as early as 1911, as to the reliability of the elevations obtained from the Snail Island monument. This culminated in the determination in 1921, by T. F. Wentz and W. A. Knight under the direction of the Board of Canal Presidents that the Snail Island monument had settled 0.69 feet.

"It is evident therefore that in 1914, when Wentz and Collier ran a line of elevations from Snail Island to the Jordan Narrows that their assumption, that the elevation of the Snail Island monument was at that time the same as when established by Doremus and DeMoisey in 1899, was erroneous. The error of this assumption is proven further by the fact that Collier and Wentz found the Smith Lake monument established by Doremus in 1895 to be 0.454 feet high and the Geneva monument established by Doremus 0.488 feet high. It is evident therefore that the Snail Island monument has already settled approximately one-half foot when Collier and Wentz used it as the basis of elevations for the line which they ran to the Jordan Narrows for the purpose of re-establishing the compromise elevation."